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# Executive Recruitment

Elsewhere in this issue we publish an abstract of a letter received from a practical foundryman which voices a "grouse" that applicants to advertised vacancies published by manufacturers of castings do not receive the courtesies which are their due. We might have considered "Teak's" complaint as being an isolated case if it had not been reinforced by a second one arising from an entirely different locality, plus the visit by an executive of the highest standing, who also felt somewhat aggrieved at a similar occurrence. Applicants for jobs must first of all appreciate that it may not in all cases be possible on business grounds to be told the identity of the advertiser. One obvious reason is that it may disturb unnecessarily the harmonious relations existing between them and their staff. Needless to say, this only applies in a minimum number of cases, and we are convinced that insufficient thought is given by people seeking skilled assistance to the opportunity afforded to spread goodwill throughout the industry. Fundamentally, the situation is that a concern needs help in their endeavour to maintain or increase their profit or profit-making capacity. Thus an unsuccessful applicant for a vacancy should be treated, not as a mendicant, but as one who has offered to risk his "technical" capital in an industrial partnership. There is probably an insufficient realisation, when an advertiser receives a wad of replies, just what each letter has meant to the individual applicant. The majority of applications are out of the running because the writers have not made the effort to ensure that they possess the qualities for an executive position in industry. They may not have learnt to express themselves in clear English; to visualise what they have got for sale or to realise what will appeal to a busy man with a sheaf of letters before him. Yet we feel that, wherever possible, replies should be sent even if anonymity be retained. Such letters are not easy to compose, for an advertiser has no right to assume the role of critic or counsellor; nor it is wise to give reasons for non-selections. However, all candidates can be thanked for the trouble they have taken and a hope may be expressed that they may soon find a position, which will be congenial in every way.

A factor which seems to worry most applicants is a request to "state salary required." This stereotyped phrase could well be omitted, and the amount it is proposed to pay can be disclosed at a later stage. Yet where an increase in salary is the sole motive for wishing for a change, the applicant should be specific on this point. Because living conditions vary from district to district and housing accommodation is at a premium, any stated salary is not a reliable index as to the real worth of a position. Thus jobs tend to become more localised, with the additional worry of charges of "poaching" against advertisers. This action is often considered at the moment to be against national interests, as it starts a game of "general post," which reacts unfavourably on production.

We hope that what we have written will help to place this business of executive recruitment in a better perspective. Applicants must realise that it would be impertinent of prospective employers to give advice or encouragement. Nor must they invariably expect even an acknowledgment. On the other hand, we do insist that, wherever possible, applicants should be thanked in really courteous terms.

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## Symposium on the Peeling of Whiteheart Malleable Cast Iron

A meeting to discuss the peeling of whiteheart malleable cast iron and the penetration of sulphide in the carburisation of steel will be held at the offices of the Iron and Steel Institute, 4, Grosvenor Gardens, London, S.W.1, on Thursday, April 8, 1948, at 2.0 p.m. Mr. J. G. Pearce, Director of Research of the British Cast Iron Research Association, will be in the chair. A buffet luncheon (price 6s.) will be served in the Institute's offices at 1.0 p.m., before the meeting.

The following are the Papers for discussion:—"Introduction," by J. C. W. Humfrey; "The Formation of Peel on Whiteheart Malleable Cast Iron," by A. Preece and K. J. Irvine; "Peel on Whiteheart Malleable Cast Iron," by J. S. Bowden; "Peeling of Whiteheart Malleable Iron," by G. R. Webster and A. E. Probst; "Experimental Work Carried Out at the British Cast Iron Research Association," by J. Bernstein, and "Sulphide Penetration in the Carburisation of Steel," by A. Preece and K. J. Irvine. Members of the Institute of British Foundrymen and of the staffs of member-firms of the British Cast Iron Research Association are cordially invited to attend the meeting and join in the discussion. Persons who are not members of the Iron and Steel Institute can obtain an advance copy of the Symposium and Paper, and a ticket for the buffet luncheon, by sending their application, accompanied by a remittance for 10s., to the secretary of the Iron and Steel Institute, 4, Grosvenor Gardens, London, S.W.1.

## The Meehanite Training Scheme

The Meehanite Training and Education Group have just issued a 24-page booklet for schoolboys, but it is so nicely presented and so well written that likewise with an avuncular gift of a mechanical toy, the "father" will be equally interested. Psychologically this booklet is well in advance of other publications. The sentences, "Then you take the train to Derby, where the instructor meets and takes you to your lodgings," and "The smaller illustration shows the enamel lapel-badge—also handsome in colour—for wearing in your ordinary clothes to show you are a special apprentice," are excellent. If builders could sell houses to people by calling attention to a recessed soap dish in the bathroom, then surely one is on good grounds in hinting to such small things—quite important to the schoolboy mind—as lapel buttons. Everything that the boy wants to know is well set out. The things which really are not of interest to him are passed over by referring them to parental investigation. Wisely, reference is made to Juvenile Employment Bureaux, where one can assume "official" blessing has been received. Unofficially the reviewer is informed that organised foundry associations can receive copies on writing to 66, Victoria Street, S.W.1, but that the supply is too limited to extend the offer to individual firms. Candidly it is an excellent piece of propaganda for the youth of this country to become not just moulders but "Meehanite" moulders—another prestige touch!

## Forthcoming Events

*(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)*

MARCH 15.
**Sheffield Society of Engineers and Metallurgists.**
"The Cold Working of Metals," by Dr. C. H. Desch, F.R.S., at the Royal Victoria Hotel, Sheffield, at 6.15 p.m.

MARCH 16, 17, 18.
**The Institute of Metals.**
Annual General Meeting at the Institute of Civil Engineers, Great George Street, London, S.W.1 (detailed programme published in the JOURNAL last week).

MARCH 16.
**Sheffield Metallurgical Association.**
"Recent Developments in Non-Ferrous Metallurgy," by Dr. A. G. Quarrell, at the Metallurgical Club, 198, West Street, Sheffield, at 7 p.m.

MARCH 17.
**North-Western Fuel Luncheon Club.**
"House Warming," by Dr. Harold Hartley. Assembly at 12 noon for Luncheon at 12.45 p.m., at the Engineers' Club, Albert Square, Manchester.

**Institution of Production Engineers.**
*Birmingham Section*:—Annual General Meeting, followed by "Accurate Costing in a Medium Sized Engineering Organisation," by J. Loxham and G. A. H. Shutes, at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 7 p.m.

MARCH 18.
**Institute of British Foundrymen.**
*Lincoln Section*:—"Recent Technical Developments Applicable to the Production of Castings," by E. C. Dickinson, at the Lincoln Technical College, at 7.15 p.m.

MARCH 19.
**The Institute of Metals.**
*Sheffield Section*:—"Centrifugal Castings," by J. F. B. Jackson, B.Sc., at the Mining Lecture Theatre, The University, St. George's Square, Sheffield, at 7.30 p.m.

MARCH 20.
**Institute of British Foundrymen.**
*Bristol and West of England Branch*:—"Ferrous Die-Casting," by H. A. Redshaw, at the Grand Hotel, Broad Street, Bristol, at 3 p.m.

## Malleable Iron Castings

Two new specifications, 309:1947 (Whiteheart) and 310:1947 (Blackheart) have now been issued by the British Standards Institution (28, Victoria Street, London, S.W.1), at 2s. post free.

For whiteheart there are to be two grades, and, what is most extraordinary, the second grade is the better. The major differences being that grade 2 runs a couple of tons higher tensile, has double the elongation and bend tests, the actual figures varying with the sectional thickness. A range of three are listed, over $\frac{5}{8}$; between $\frac{5}{8}$ and $\frac{1}{16}$, and under $\frac{1}{16}$. The highest tensile properties required are 24 tons tensile on a 0.564 bar, with 8 per cent. elongation and 90 deg. bend.

For blackheart, there are three grades, and again the first grade material is the poorest. The best material specified has the following minimum properties: 22 tons tensile, 14 per cent. elongation, and 135 deg. bend. In this case there is no reference to section thickness.

MR. JOHN BOLTON has resigned his appointment on the staff of the Institute of Cost and Works Accountants and is joining Mr. John Gardom, Consulting Engineer, of Ripley, Derbyshire.

# Problems in a Quantity Production Foundry*

*By J. Hird*

A quantity production foundry is frequently referred to as a semi-mechanised foundry. The term is really misleading. A quantity production foundry can be, and often is, fully mechanised within the limits of the type of castings produced.

Foundries which have the highest degree of mechanisation are those making large quantities of castings off a limited range of patterns, usually similar in type. These foundries are often "captive," that is, they are part of a large engineering works which use the castings in their product. Such firms sometimes purchase from other foundries castings which are not wanted in large quantities, or are unsuitable for their mechanised production methods.

It is hoped the expression "semi-mechanised" will not become a common phrase in foundry terminology, for when it is used to describe a foundry not entirely mechanised, it implies something incomplete, yet such foundries can be fully mechanised within their own economic sphere.

### Moulding Mechanisation

The extent to which the moulding operation can be economically mechanised has to be carefully considered. The three governing factors are:—

(1) *The Quantity Required.*—In some trades large orders are placed which appear suitable for quantity production, but when delivery schedules are studied, it is frequently found that the spread-over of delivery is such that quantities are small and cannot be economically produced by quantity production methods. For instance, an order for 10,000 castings looks like quantity production, but if spread over 12 months is only 200 per week, which would be about half a day's production in a quantity production foundry. This is not sufficient to warrant its inclusion in the programme unless run for a week, once in ten weeks. While this might be done for one job, it cannot be done for many, as storage room would not be possible, and few foundries have the capacity to run jobs so far in front of schedule without falling down on the commitments for other jobs.

(2) *The number of different jobs and the extent to which they differ one from another.*—If jobs are similar in character and go in the same size box, it is possible to run them in a quantity production foundry on much smaller runs than when they are at variance.

(3) *Their Continuity.*—If jobs are assured of repeat orders, then they will warrant provision of first-class pattern equipment and suitable moulding boxes, which are an essential of satisfactory quantity production.

### Manning of Moulding Machines

One man per unit gives maximum production for minimum labour costs, providing the mould being made is capable of being handled by one man.. Two men do not give double production—but double the labour costs. Three men do not give treble production of one man—but treble labour costs and so on. Therefore, the manning-up of moulding machines is a difficult and complicated problem. When production is wanted, it is tempting to put on extra labour. Production goes up and deliveries are easier, but the cost per casting in man-hours has gone up, too.

Without auxiliary mechanical aids to cut material handling by man-power, the installation of moulding machines will not substantially increase production unless accompanied by an increase in man-hours per casting. One plate moulder working on the floor, moulding, casting and knocking-out his own work, would pro-

FIG. 1.—TRAVELLING SCALE CAR AND CHARGING SKIP.

*A Paper read before the Wales and Monmouth Branch of the Institute of British Foundrymen.

## *Problems in a Foundry*

bably make 80 moulds per day. One man working on a moulding machine without any auxiliary mechanical aids and moulding, casting and knocking-out his own work, would probably make the same quantity.

The labour effort saved in ramming the moulds would be expended in the extra distance the moulds have to be carried. This argument will break down on certain jobs which have a deep lift or are too heavy for a plate moulder to handle, but is sound for the majority of straightforward jobs. Production can easily be increased by putting extra labour to carry moulds, cast and knock-out, but the man-hours per casting rise, too, because one extra labourer would not double the production of the first man nor would two extra labourers treble the production.

Many executives have found, after installing moulding machines to replace plate moulding, that production has gone up, but the man-hours to produce each casting have also risen. The consolation in this disturbing fact is that the castings are dimensionally more accurate and the skill required to produce them is much less. The increase in man-hours per casting is usually overcome by installing auxiliary mechanised aids to the actual moulding machine operation. Generally, this cuts down flexibility and makes the changing of patterns and jobs more difficult. Mechanical operations for any one moulding machine are rarely suitable for patterns which are not moulded in the same or similar boxes.

For the type of work being produced at Coneygre foundry this problem has been fairly satisfactorily overcome by the installation of self-contained units. A description of one of these units was the subject of a short paper by Mr. A. Wood presented to the Birmingham Branch of the Institute of British Foundrymen, and published in the FOUNDRY TRADE JOURNAL for March 2, 1944, under the title "A Small Moulding Unit."

### General Mechanisation

Every foundry with a tonnage great enough to warrant the capital expenditure can mechanise some parts of its plant. Foundries not in the mass production class are more certain of success, economically, if they mechanise metal melting, molten metal transportation, sand-handling and similar operations first. The problems involved are generally far less complex than when mechanising the actual moulding operation.

*Melting Plant*

A mechanised melting plant for a quantity production foundry should be capable of considerable flexibility. Tonnage requirements frequently vary from day to day without any changes taking place in personnel or productive capacity, due to changes in weight and intricacy of castings being produced.

The melting plant at Coneygre is mechanised and capable of handling up to 75 tons in nine hours. A total of eight men are employed on the plant, three chargers, one gantry crane driver, one cupola man, one cupola fettler and his mate, and one receiver operator.

The railway trucks of pig iron, coke and scrap come in off the siding and are unloaded under the gantry by the magnet, and put into the bunkers or placed in heaps opposite the bunkers if these should be full. Coke is loaded into a drop-bottom skip, and put in the coke bunkers. Stocks of coke are kept by the siding and brought in under the gantry as required in tumbrils hauled by a tractor.

FIG. 2.—CLOSE-UP OF CUPOLA SYPHON TAPPING BOX.

*Cupola Charging*

The travelling weighing machine (see Fig. 1) moves the skip in front of the bunkers. Cast-iron scrap, pig-iron and steel scrap are taken from the bunkers by hand and loaded into the skip to the correct weight. The bottom of the bunker and the top of the skip are the same height. No lifting is required, the material is slid over into the skip. Coke and limestone are added from the hoppers over the skip. One ton charges are used, the complete charge of iron, coke and limestone being split over two skips.

The skip is pushed off the scale car into the hoist; the empty skip being first removed from the hoist on to the second leg of the forked

rails in front of the hoist. The scale car is then moved in front of the empty skip which is pushed on to the scale car and loading proceeds. The two cupolas are used on alternate days, and the single hoist is arranged between them. The top of the hoist is fitted with a change-over flap on the chute into the cupolas.

The cupolas are fitted with a row of 10 main tuyeres 6 in. dia. and a row of 10 auxiliary tuyeres 2 in. dia., 18 in. above the main tuyeres. During operation there are only a few inches of metal in the well, as the metal is run direct through a syphon tapping box (Fig. 2) into a 3-ton receiver. A two-foot blanket of slag collects in the well and this assists in purifying the metal as it falls through the slag. At the end of the day, before the bottom is dropped, this slag is run off through a special tapping hole. This gives a clean drop with the coke easily recoverable.

The syphon tapping box has a slag weir on the side which comes into operation after about one hour's running. The slag is collected in conical-shaped ladles standing on stillages, and holding 30 cwts. of slag. When full they are taken under the gantry crane. The slow cooling of the slag, resulting from the large bulk, makes it hard and granite like, and suitable for road-making, and it is sold for this purpose.

*The Metal Receiver*

The receiver* is gas-fired for heating up its lining. But little heat is obtained from the gas for heating the metal, and once casting has started the gas is turned off. The receiver is electrically operated for tilting the metal into 6-cwt. ladles carried on the monorail.

Owing to the varying demands for metal by the moulding shop, the receiver tends to fill up when requirements are low. When about three tons has collected in the receiver the wind is shut off the cupola and the metal flow through the syphon box stops. When the stock in the receiver is reduced to about one ton, the wind is again put in the cupola, and melting proceeds. The frequency with which this operation occurs depends on the demand for metal by the moulding shops. A certain amount of control can be obtained by reducing the blast pressure, but this is not often resorted to as it tends to produce cold metal and irregular metal composition.

## Core Sand Preparation

*Mixing Platform*

The mechanisation of the core shop must be flexible as the quantity of cores required fluctuates, and unless large stocks of cores be carried to flatten out such fluctuations, core production must be capable of meeting the day-to-day demands. The first stage in core-shop mechanisation is sand mixing and distribution, because whatever type of cores are being made, core sand will be needed. The mechanisation of individual core production can only be done when numbers and continuity are assured, and each job must be judged on its merits.

Fig. 3 shows the core sand mixing platform, which is situated in the centre of the shop. The core sand is dried in a gas-fired rotary drier situated outside the foundry, and served by railway siding and road. The dry sand from the drier is sucked along a pipe line and settled in a cyclone above the bunker. This operation also cools the sand. The box under the bunker is the discharge hopper into the mixer and holds 900 lbs.—a full mixing for the core sand mixing machine. There are two of these units in operation on the platform, and two sand driers. One unit has a bunker divided into four for handling different types of sand.

Core oil is delivered to the works in bulk in tank lorries which pump the oil into a storage tank situated near the sand driers. The oil is pumped from this tank to the measuring device on the right of the sand measuring hopper and from this is discharged direct into the mixer.

The core sand when mixed is discharged into wheeled bogies, pushed down the platform and tipped into hoppers over the core benches. This gives flexibility when special mixes of sand are required or a job is using an unusually large amount of sand.

*Pendulum Conveyor*

The core benches are arranged under the hoppers and the cores, when made, are placed on a pendulum conveyor which circumnavigates the core shop; it is 360 ft. in length and carries 90 pendulum racks. It moves at the rate of 3 ft. per minute, making one circuit in two hours.

At one end of the shop are two continuous vertical core drying stoves. These are loaded from the pendulum conveyor on one side, and the dried cores are discharged on to a band conveyor on the other side.

FIG. 3.—CORE SAND MIXING PLATFORM.

* For illustrations and other details see F.T.J., November 7, 1946, "The Coneygre Foundry," by V. C. Faulkner.

## *Problems in a Foundry*

*Band Conveyor and Blacking-up Section*

The dried cores are taken off the conveyor at various points, jigged, tested for vents, and blacked. They are then returned to the band conveyor which takes them to a third continuous vertical stove which is used for drying the blacking. From the blacking drying stove the cores are placed on a second band conveyor which takes the cores to storage racks adjacent to the moulding shop.

The mechanisation of core production consists of two Titan core-blowing machines, a power turn-over machine, several hand turn-over machines and a power driven rotary core-making machine of the sausage-machine type, used for making cylinder barrel cores. The core shop is situated in the centre of the foundry and supplies an average of 9,000 cores daily, having a total weight of 20 to 25 tons and an average weight of 5 lbs. for the moulds made in the green sand and cylinder moulding shops.

### Moulding Section for Cylinder Moulds

The cylinder shop shown in Fig. 4 is situated on the opposite side of the foundry and produces some 30 different types of cylinders, crankcases and cylinder heads, 90 per cent. of which are dry sand jobs, and range in weight from ¼ cwt. to 8 cwt., and in quantity from 1 per day to 50 per day. The moulds are made on roll-over moulding machines in a self-contained section. There are four Herman-type moulding machines, two of 4,000 lb. and two of 2,000 lb. capacity. The moulding boxes are put on the two small machines with a jib crane, and on the large machines by a dual mono-rail hoist. After stripping moulds are discharged on to roller track for blacking-up and finishing, ready to be stoved.

The machines are supplied with sand from overhead bunkers, which are fed by a rubber band conveyor belt with sand from a continuous sand system. The sand for this system comes from the knock-out which is under the gantry cranes in the main bay of the shop, and is manually operated owing to the variance in size and weight of boxes handled.

The sand from the knock-out is put down a grid and taken up an inclined belt through a Synex screen and under a magnetic separator into the top of a 100-ton ferro-concrete storage bunker. A rotary table discharges the sand from the bottom of the bunker on to further inclined belts which convey it to two August Simpson No. 3 sand mills.

### Sand Mills for Cylinder Moulding Section

The sand mills for the cylinder moulding section shown in Fig. 5 are used alternately, and give a practically continuous supply of sand. A unique feature of this plant is that all the sand conveying is done by inclined belts. No bucket elevators are used, the maintenance is very light, and breakdowns or hold-ups extremely rare.

Water, bentonite, new sand and coal dust are added to the sand on the belt coming from the bottom of the bunker. Final adjustments for water are made at the mill; this arrangement keeps the dust down to a minimum, and as the sand is transferred on to two other belts before reaching the mill it receives a preliminary mixing. Adding dry coal dust and bentonite at the mill was found to cause dust and wastage.

### Coring-up Section

The moulds are dried in thermostatically controlled, re-circulation stoves at 500 deg. F. (260 deg. C.) for 9 hrs. The jobs that are produced in quantities are cored up on roller tracks by a gang of men (see Fig. 6). Each man is responsible for a portion of the core setting and jigging operations. The bottom parts of the moulds are placed on the track nearest the wall and pushed round after each operation until all the cores are set. The top parts shown in the foreground of Fig. 6 are then picked up with a wall jib crane and the moulds are closed on the track. After bolting up they are picked up and turned on edge and placed for casting on the rail shown in the front of Fig. 6.

FIG. 4.—CYLINDER MOULDING SECTION OF THE FOUNDRY.

### Casting Inspection Department

All castings after cleaning and fettling are inspected for defects in the shop, shown in Fig. 7. Cylinders and cylinder heads are set up in jigs to check machining allowances and dimensional correctness. These castings have a long machining cycle; errors missed here may be discovered in the machine shops, after many hundreds more castings have been made carrying the same

error. The castings are sent on an electrified mono-rail from the inspection department to the despatch stores, where they are counted, weighed and stacked ready for loading on to lorries that back into the loading bays arranged at deck height.

### Controls: Chemical Laboratory

An important aspect of mechanisation is the increased control necessary for checking materials and co-ordinating operations to prevent scrap and bottlenecks in production. Material control is the responsibility of the laboratory. In addition to checking incoming raw materials the chemical laboratory takes a silicon and carbon analysis on the cupola metal every hour and a complete analysis twice a day. Chill tests are also taken at the receiver spout on every ladle of metal. The depth of chill is measured and recorded, with the silicon and carbon figures, on a blackboard near the cupola for operators and staff to see.

If the chill is too deep or the metal is required for thin section castings, ladle additions of ferro phosphorus, ground carbon or calcium silicide are made. If chill is too light, or the metal is going into castings of heavy section, steel additions are made. With these variations the foundry is run on one metal analysis which has a 2.2 per cent. silicon and a 3.3 per cent. carbon.

### Sand Laboratory

The sand laboratory checks its incoming raw materials and runs routine tests for moisture, permeability, strength and shatter on every second mixing of sand made in the foundry. The shatter test is important and not so well known as the other tests. The discharge point of this apparatus is shown in Fig. 8. A standard 2 in. by 2 in. dia. sand sample is rammed up in the usual way and stripped on an inverted stripping post which is 6 ft. above the base of the apparatus.

The sample falls on to a hinged plate and sieve assembly and breaks up, as shown in Fig. 9. The plate is turned up and the sand slides on to a ½-in. mesh sieve. The sand which remains on the sieve is weighed and expressed as a percentage of the total weight of sand taken. A friable sand leaves little sand on the sieve, while a stiff putty-like sand does not break into such small pieces and will leave more sand on the sieve.

It is well known that the usual strength figure alone can give a misleading idea of the suitability of a sand for moulding. A dry friable sand can give a high strength figure and be quite unsuitable for moulding, but when the strength figure and the shatter percentage figure are studied together, the true nature of the sand is revealed. The sand test figures obtained in the laboratory are put on boards adjacent to each mill for operators and staff to see.

### The Control of Production

In a foundry making castings which require a large quantity of cores and which has a frequent change of programme, the co-ordination of mould and core production must be under efficient control. It is essential that all the cores are ready when a particular job is planned to go into production. A breakdown caused by the lack of one core can upset the whole programme and have repercussions for days afterwards by causing a serious loss in productive man-hours. The production is planned round a weekly programme, compiled from schedules issued by the customers. Orders are accepted by the sales department, according to the loading on the various units.

The loading is clearly shown on a chart by means of small celluloid indicators which fit into slots on the chart. Each indicator represents half-a-day's production on a unit.

When an order is taken, it is allocated to the unit most suitable for its production and the requisite number of indicators added to the chart to complete the order. A duplicate of the chart is kept in the Managing Director's office. The weekly programme is issued, to all departments, at the middle of the week previous to its operation. When all departments have had time to study the programme a production meeting is held, attended by foremen and managers. Any difficulties likely to be met with in operating the programme are discussed and alterations made when necessary.

FIG. 5.—SAND MILLS FOR THE CYLINDER MOULDING SECTION.

## *Problems in a Foundry*

FIG. 6.—ROLLER TRACK FOR COREING-UP MOULDS.

### Core Production Sheets

The core production is controlled from an office in the core shop. Each operator goes to the office for his job slip and then to the corebox stores—adjacent to the office—for the corebox. When the order on the job slip is complete the cores are checked by the charge-hand and the operator returns the corebox to the stores, and the slip to the office, and receives another job slip, and so on. The job slips are made out from a master sheet on which each job and corebox is planned for the weekly programme. A close liaison is kept between the moulding shop foreman and the core-shop office to prevent cores being made that will not be used. Should a moulder be absent and production on a job reduced, the core-shop office is notified at once and core production reduced; or if a fault develops in a pattern and the job is withdrawn, core production is stopped, too; it is a basic instruction to all foremen to send a departmental communication to the core-shop office as soon as a job stops.

The time allowed in the core shop to produce cores ready for the foundry is two days for simple cores, three days if there is a core assembly. This method prevents the accumulation of large stocks of cores with the resultant deterioration and loss through breakages.

### Recording and Control of Scrap Castings

A foreman with experience of the class of work being made is in charge of scrap records, and preventive work. He is responsible for getting a batch of castings through to the inspection department quickly, every time there is a change in programme. An important point in keeping scrap low is that the dressing shop must be able to clear all castings daily. A weekly scrap record is kept of each job showing the production and individual cause of scrap. These are totalled monthly, and are compiled from daily scrap and production sheets. The weekly scrap sheets are analysed with the foremen each week. Any alterations made to reduce scrap are entered on the back of the weekly record sheets, together with the date; in this way the effect of any alteration can easily be seen.

To prevent trouble being repeated on jobs that are not in frequent production an indexed file is kept. In this is entered any special instructions, such as, care in ramming, special sand to be used, special metal, and similar notes. The weekly programme is checked against the index in the file, and any job having special

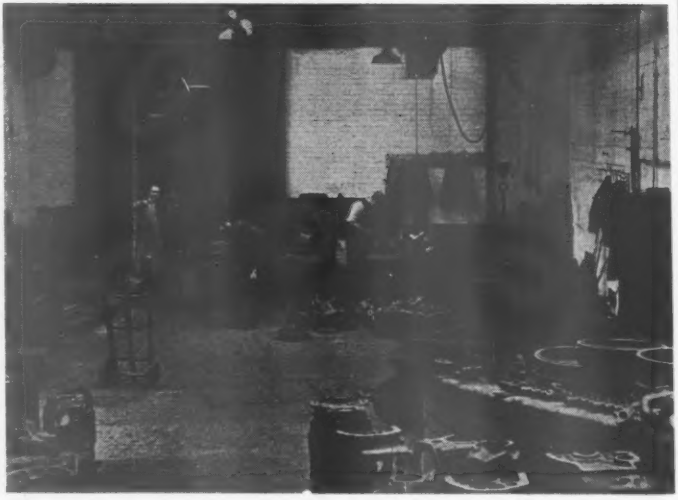

FIG. 7.—INSPECTION OF CASTINGS AFTER DRESSING.

instructions is picked out. A general directive note is then sent to the foreman in charge of the job. This eliminates the possibility of special instructions being forgotten, and reduces the risk of scrap due to causes that have already been overcome.

### Conclusions

An endeavour has been made to outline the problems of quantity production foundries, and to show how some of the difficulties can be allowed for and overcome by planning.

The author has not stressed the advantages of quantity production as he felt that these are obvious, but like any other advancement, quantity production brings its own problems which have to be solved.

It is certain that if the foundry industry is to meet the demands that are being, and will be made for quick delivery of good quality castings, many more foundries must develop on quantity production lines. The shortage of skilled moulders will also force many foundries to mechanise in the near future. In conclusion, the author thanks the Directors of Coneygre Foundry Limited for their permission to give this Paper and their assistance in providing the illustrations

## DISCUSSION

Dr. Bryn Jones asked the lecturer whether the metal in the receiver retained its temperature indefinitely, and would Mr. Hird recommend the use of a receiver as against tapping direct from cupola. Also did he find any damage occur to moulds on the roller conveyor.

Mr. Hird replied that the receiver ensured a constant supply of metal following the first tap, there being a syphon box for trapping slag. Temperature was not maintained in the receiver, but the loss was more apparent in the early hour of blow when it was necessary to take away the metal without undue delay. Later, as the receiver temperature rose, the loss was negligible. With a ton of metal in the receiver one was sure of a better mixing than when taking metal direct from the cupola. Hot metal was essential for most of the work in production. Damaged moulds due to conveyor vibration was a very rare occurrence. The sand used being open texture, it was possible to jolt-ram very hard. Incidentally, the conveyor was kept in perfect running order, and a faulty roller was replaced as soon as detected.

FIG. 8.—RELEASE OF SAND SAMPLE IN THE SHATTER TEST.

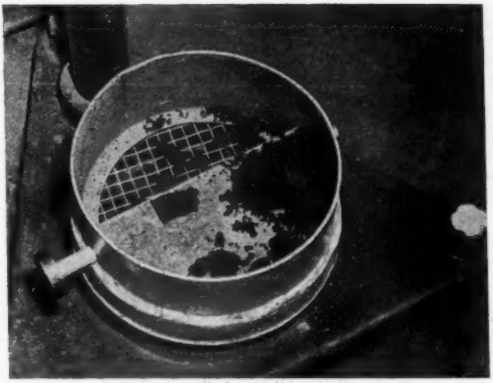

FIG. 9.—HINGED PLATE AND SIEVE ASSEMBLY FOR THE SHATTER TEST.

Mr. H. J. V. Williams enquired as to the type of chill test in use; he also commented on the absence of fettling shop information.

Mr. Hird said the chill test was made by inserting a slotted core in a metal cup. The core left a portion of the wall of the cup exposed. This chilled the edge of the test piece when the metal was poured into the cup. The depth of chill was then measured with a measuring device. As to fettling shop, this had been omitted as the equipment was not yet completed though improvements were in progress.

Mr. Gordon Jones asked what diameter cupola was in use and the number of tuyeres in service and their ratio to diameter? What were the pin tolerances on moulding boxes?

Mr. Hird replied that the cupola was 48 in. inside diameter with 10 tuyeres of 6 in. diameter, and a higher row of 10 tuyeres 2 in. diameter. The pin tolerance on moulding boxes was 0.005 in.

Mr. Kinsman enquired whether, when using synthetic sand, if the mould were burnt in drying, sand ran out when the face of the mould was broken.

Mr. Hird said the face of the mould would collapse, if the skin were broken and the mould was burnt. The mould stoves, however, were thermostatically controlled

## *Problems in a Foundry*

and of the re-circulating type, and burnt moulds were extremely rare.

At the conclusion of the discussion Mr. H. J. V. Williams, in proposing a vote of thanks to Mr. Hird, said it was always of interest to hear how another foundry surmounted its problems of production. He gathered that Mr. Hird did not frequently encounter wide variations in section, from the type of castings illustrated, and so was saved quite a few worries in that respect.

After Mr. Gordon Jones had seconded, Mr. Hird expressed his appreciation of the reception given him and the interest evinced by the discussion.

## Farewell Luncheon to Mr. G. W. Rousham

Last Tuesday, at the Café Royal, Regent Street, W.1, Renshaw Foundry, Limited, were the hosts at a luncheon party organised for the purpose of wishing God-speed to Mr. G. W. Rousham, the joint managing director. Mr. Rousham has bought the firm of Monteath Brothers of Subraico, Perth, Western Australia. He sails on March 25. Mr. H. J. Macnamara, the chairman of Renshaw Foundries, presided, and the principal guests were Mr. Rousham and the Hon. W. H. Kitson, the Agent-General for Western Australia. Amongst the numerous guests present were Mr. R. B. Templeton, president-elect of the Institute of British Foundrymen; Mr. D. Howard Wood, and Mr. V. C. Faulkner, both past-presidents.

Mr. Rousham ascribed much of his success as a foundry executive to the help given to him by the staff of the Mond Nickel Company.

The Hon. W. H. Kitson said that the Broken Hill Company were now producing 10,000 tons of charcoal iron a year in Western Australia, and the firm of Chamberlain Industries were to make 2,000 tractors a year in that province. At the conclusion of the luncheon, Mr. Frank Hudson, of the Mond Nickel Company, showed two films, one of the cupola practice at Renshaw Foundry and the other of the lost-wax investment process.

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THE BRITISH STEELFOUNDERS' ASSOCIATION last week organised a visit by the technical Press to the works of K & L Steelfounders and Engineers, Limited, of Letchworth, the object of which was to afford an opportunity for the guests to see the progress being made by a typical steel foundry. The advent of the research department was recorded after our last visit some two years ago. This time it was the new melting shop which was the main novelty. It houses two electric furnaces, one basic and one acid, of the latest type, that is, incorporating swing roofs for rapid charging and fully automatic control. The hosts were thanked for their hospitality by Mr. T. Summerson of Darlington, on behalf of the British Steel Founders' Association, and by Mr. V. C. Faulkner, Editor of the FOUNDRY TRADE JOURNAL. Mr. W. H. Morton responded in the absence of Mr. F. W. Rowe, the managing director.

## Mond Nickel Fellowships

The Mond Nickel Fellowships Committee announce with pleasure the award of two Fellowships for 1947. These awards have been made to:—

Mr. L. H. Walker (Reynolds Tube Company, Limited) to study "The Organisation and Economics of Light Alloy Production and the Methods of Application of Group Industrial Research."

Mr. D. R. G. Davies (Richard Thomas & Baldwins, Limited) to study the application of statistical methods to plant metallurgical and management problems, with particular reference to the steel industry.

The Committee now invite applications for the award of Mond Nickel Fellowships for the year 1948. Awards will be made to selected applicants of British nationality, educated to University degree or similar standard, though not necessarily qualified in metallurgy, who wish to undergo a course of training in industrial establishments. They will normally take the form of travelling Fellowships; awards for training at Universities may be made in special circumstances. There are no age limits, though awards will seldom be given to persons over 35 years of age. Each Fellowship will occupy one full working year. The Committee hope to award up to five Fellowships each year, of an average value of £750 each.

Applicants will be required to state the programme of training in respect of which they are applying for an award, as well as particulars of their education, qualifications and previous career. Full particulars and the necessary forms of application can be obtained from the Secretary, Mond Nickel Fellowships Committee, 4, Grosvenor Gardens, London, S.W.1. Completed application forms will be required to reach the Secretary of the Committee not later than June 1, 1948.

## House Organ

**S. & W. Magazine for March.** Issued by Smith & Wellstood, Limited, Bonnybridge, Scotland.

This issue contains the story of the installation of one particular moulding machine, which has made 6,638 moulds, and the saving in human effort which results. Such notes are really worth while as they bring to the notice of employees the true significance of such installations. There is also an obituary notice covering the career of Mr. W. Walker, who, in 1920, joined the Institute of British Foundrymen as an associate member. He was with the firm for 47 years; before his retirement he was in charge of the fitting shop.

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THE INSTITUTION OF PRODUCTION ENGINEERS announces that the medals presented for the best Papers read to the Institution during 1946-47 have been awarded to Mr. W. H. Tait, M.M. (Metallurgical and Engineering Consultant), for his Paper on "Plain Sleeve Bearings, Materials and Design," and Mr. R. E. Wilson, M.I.A.E. (managing director, Fescol, Limited, London), for his Paper on "The Relative Merits of Electro-deposited Nickel and Chromium."

# The Induction-heated Cupola*

Development of a melting unit combining the advantages of a cupola with the advantages of the electric-induction furnace has been proposed by E. Piwowarsky as a means to overcome the shortage of high-grade coke and to provide a unit capable of more efficiently producing certain types of high-duty iron which cannot now be handled too well in the orthodox cupola.

The induction-heated cupola, the result of considerable experimental work done in Germany, was proposed by Dr. Piwowarsky at a foundry meeting held in Aachen, Germany, last year.

### Construction

While the description given of this furnace appears to ignore a number of practical construction and operating problems, it should have some unusual and highly interesting production characteristics. A cupola furnace heated by induction (see Fig. 1) consists, according to the author's proposal, of the normally constructed upper section of a cupola, operated either with cold or hot blast. The underframe, however, is constructed in the form of a furnace which operates at high or low frequencies. In principle it is necessary that the well of the induction cupola be filled with coke. Alternatively, it is possible to construct the induction furnace as a forehearth, and fill it in accordance with the above-indicated rule with coke or charcoal. This fuel, by means of some suitable weighting device, should be kept, at least partially, underneath the melting zone. In addition, the construction of the induction furnace requires the following:—

(1) The underframe, or forehearth, heated by induction, should be constructed as a furnace provided with a tapping spout for the melted metal.

(2) The underframe, heated by induction, must be constructed so that it can easily be disconnected from the melting and preheating area of the cupola, prefer-

*Reproduced by permission of the Editor of "The Iron Age." For the sake of clarity some of the expressions have been slightly modified to conform to the phraseology used in this country.

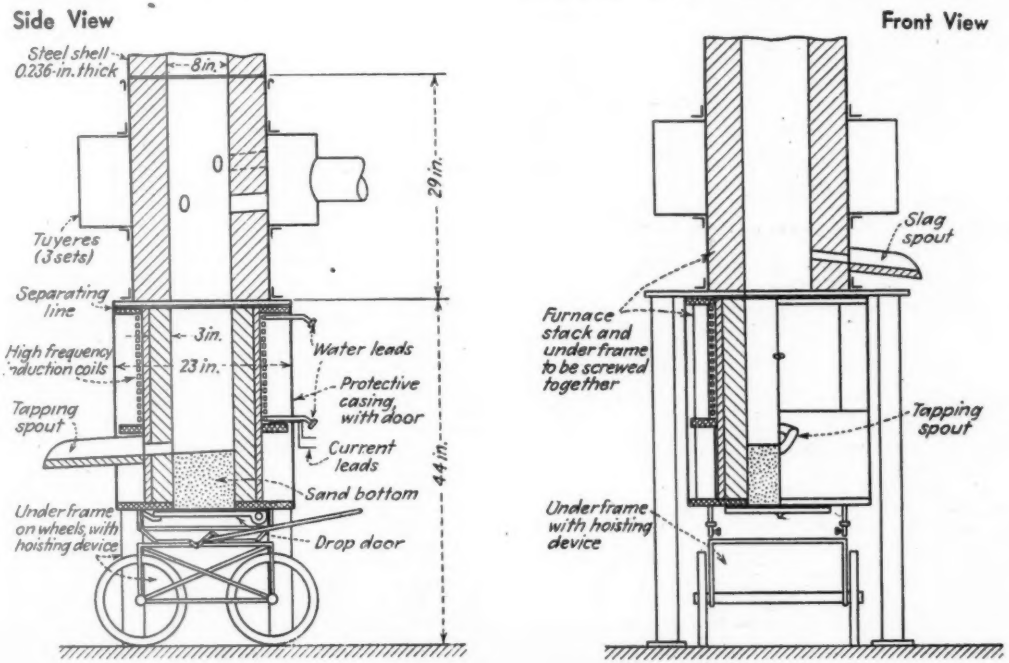


FIG. 1.—LABORATORY MODEL OF HIGH-FREQUENCY INDUCTION-HEATED CUPOLA, CAPACITY 650 LB. PER HR., REQUIRING BLAST AT 130 TO 175 CUB. FT. PER MIN.

## *Induction-heated Cupola*

ably mounted on wheels, or so constructed that it can be raised and lowered.

(3) The underframe, heated by induction, should be provided with rammed sand on the bottom of the hearth and with a drop door which can be easily handled. This bottom, however, could be made also from some other refractory material, such as corundum, etc., placed on the bottom of the hearth.

### Advantages Claimed

The metallurgical advantages of the furnace combination proposed here include the following:—The iron, which has been pre-melted in the cupola, very advantageously as far as the technique of heating is concerned, is delivered without any loss of temperature into the forehearth which is heated by induction. Here it can be superheated by from 110 to 120 deg. C. with an energy of only 60 to 120 kW. hr. per ton. Also, since the cupola can be heated with small coke charges, the absorption of sulphur by the iron will be kept within moderate limits.

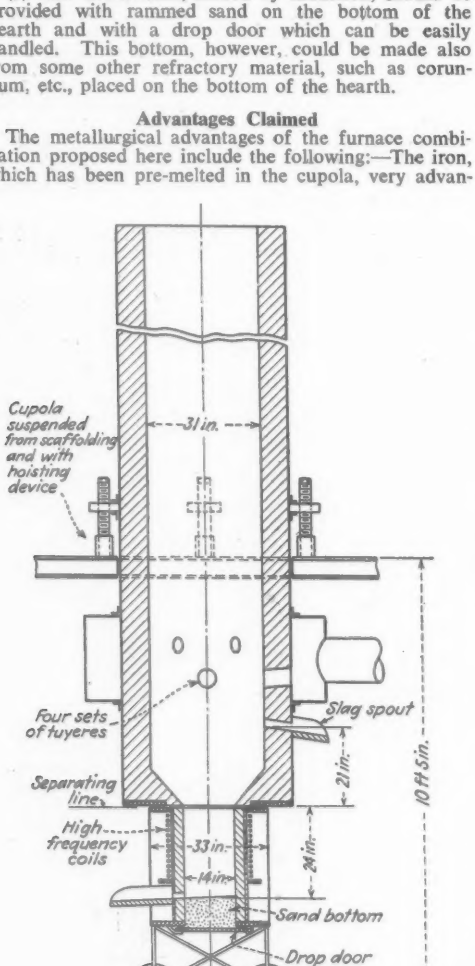


FIG. 2.—SUGGESTED DESIGN FOR A LARGER TYPE OF INDUCTION-HEATED CUPOLA RATED AT 4 TONS PER HR.

The fluxing action in the induction-heated underframe will clean the coke bed constantly of the accumulating slag and will permit a uniform and fast combination of the carbon with the iron, even when a high percentage of steel is present in the alloy. The strong whirling action in the coke bed, due to the high frequency field, is beneficial in purifying the molten iron and removing occluded gas.

By charging the induction-heated underframe partially or wholly with highly-refractory fragments, as, for instance, with round pieces of corundum, the absorption of carbon can be kept within certain limits or can be totally avoided. By thus combining the furnaces, it will therefore in all probability be possible to melt alloys from those of low carbon content up to tool steels and high-carbon content steel for castings.

### Structural Limitations

The underframe of the furnace can be constructed, according to Dr. Piwowarsky, so as to operate either on high or low frequencies. From a metallurgical and operating point of view, the high-frequency furnace is preferable. On the other hand, the construction of a furnace operating at lower frequencies would be cheaper and could be connected to existing power sources. However, when in operation, the secondary channels located in the lower portion of the furnace-stack would probably be somewhat in the way. There might also be the danger that secondary channels might become clogged with pieces of coke. It is a fact that the high frequency field produces greater lining wear, and it is therefore possible that the lining of the furnace might burn out too quickly. This, however, could be checked, in accordance with a proposal of Brown, Boveri & Company, who suggest raising the induction-coil above the crucible, thus creating a portion of the melt which would not be affected by the inductive current, and which would, therefore, be at rest, and this would reduce the fluxing of the affected portion.

### Operating Conditions

Since the induction-heated underframe has to perform only the operation of the superheating, only about one-third or one-fourth of the electrical energy is needed for the quantity of molten iron that would be necessary for the melting of a solid charge. For a small cupola with a diameter of from 27 to 31 in., and with a capacity of approximately 5 tons per hr., it would not be necessary to operate with from 1,000 to 1,200 kW., as would be required if the furnace were charged with solid material. It would need, actually, 350 to 450 kW. in order to tap from the low-frequency furnace. From the high-frequency furnace, which has a capacity of around 2 tons, approximately 1.6 to 1.8 tons of metal could be tapped every 20 min.

If, besides the existing equipment of the high-frequency underframe, the furnace be provided with two crucibles, of which the one used with the induction-heated cupola would have to have approximately 60 per cent. more capacity (in accordance with the volume of the coke charge), it would be possible to produce in the furnace with the smaller heating coil, while the cupola is not operated, cast steel from a solid charge of approximately 1 ton.

Since in the low-frequency furnaces the secondary channel is difficult to maintain when the temperature of the iron rises above approximately 1,425 deg. C., it would be necessary for this special purpose to make tests with an improved lining. Of course, the best method would be the development of a low-frequency induction furnace without any secondary channels for the melting of heavy metals in the same manner as has been developed in the construction of the Brown, Boveri & Company furnace for the melting of light alloys.

The advantages of such a furnace would be that besides eliminating secondary channels and using simple types of crucibles, as are used with the high-frequency or middle-frequency furnaces, the low-frequency furnace could be connected to the existing power supply.

**Experimental Model**

Fig. 1 shows the design of the first small induction-heated experimental cupola furnace which Dr. Piwowarsky submitted to a leading builder of furnaces in Germany, so that they might work out the construction plan of the project. A small experimental cupola, with a diameter of about 8 in., which, in addition to the larger hot-air cupola, is located in the Foundry Institute of Aix-la-Chapelle, will work with an induction-heated furnace-underframe, the capacity of which will be designed in such a way that every 15 min. about 165 lb. will be superheated about 180 deg. C. (for instance, from about 1,330 to 1,510 deg. C.) and then can be poured.

Since it might be useful to construct the induction-heated underframe so that it could easily be disconnected from the melting space proper, it will be necessary to provide for the suspension of the cupola, or to support it on columns. For larger furnaces it will perhaps be necessary to construct the induction-heated underframe in the form of a forehearth, in which the continuously flowing molten iron must be run into a bed of coke or corundum, which is safeguarded against being driven upwards by weighting it down. Because of the difficulty of getting any supplies in Germany at the present time, it will be necessary, according to Dr. Piwowarsky, to construct the small experimental induction cupola in the form of a low-frequency furnace. By placing the secondary channels horizontally instead of vertically, it is expected that it will be possible to achieve special advantages from a metallurgical and operative point of view.

For larger cupolas it might be further advantageous to construct the lower portion of the furnace in the form of a cone, as shown in Fig. 2.

A combination of furnaces in the form proposed, will, Dr. Piwowarsky averred, probably comprise all the necessary advantages of a metallurgical character which must be present in order to be able to produce cast irons of any desired composition and of any desired quality. No doubt this combination would also help solve the coke problem and would be acceptable from the economical point of view, especially to the foundries which produce iron as well as steel castings.

## A New Drill Chuck Guard

Appliances to reduce the frequency of accidents to machine-tool operatives too often possess the disadvantage that they interfere with productive dexterity. This detriment is obviated in the "Decon" Drill Chuck Guard, developed and manufactured by Air Ducts Limited, Great West Road, Brentford, Middlesex, for it is designed to protect the operative, and casts "no shadows on the job." Interference with existing lighting arrangements is not necessary.

The guard, shown opened and fitted to a single-spindle drilling machine in Fig. 1, consists of two semi-circular transparent sections, moulded on a three-inch radius and fitted to a strong metal frame. Two fixing lugs with elongated slots are incorporated in the rear section and the supporting brackets are counter slotted to register the guard when the brackets are fixed to the machine frame.

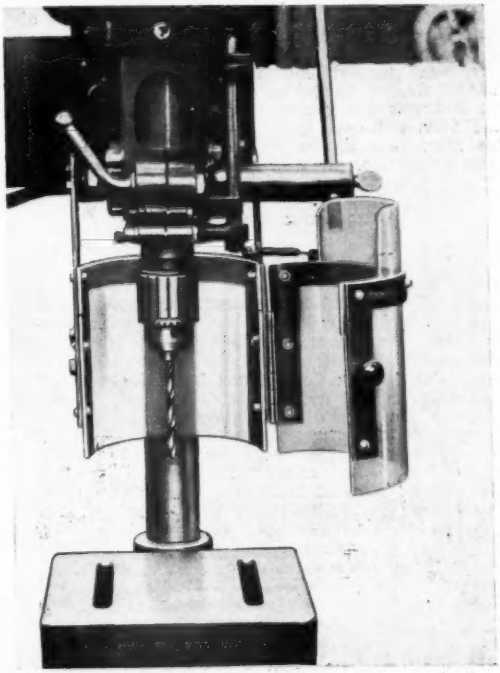

FIG. 1.—DRILL CHUCK GUARD—OPEN POSITION.

# Venting of Cores

*By "Tramp"*

The successful production of castings depends on a large number of factors, one of the most important of which is ensuring the free venting of the cores forming the interior of the job. For simple castings this is comparatively easy, but complicated work needs special treatment. Occasionally, however, even simple castings may be prone to trouble unless exceptional care is taken with the connection of the core vents to the outside of the mould.

For example, an air compressor intercooler, Fig. 1, which essentially is a cylindrical tube, A, with a baffle plate B, through the centre, which presented some difficulties when vented in the orthodox manner through the joint of the moulding box. This was because the core was practically cut into two by the baffle plate, and the gases generated on casting were forced to escape through a restricted outlet. Fig. 2 shows the method adopted to ensure the rapid evacuation of the gases. At the end of the core seats C, and D, pieces of wood were rammed up in the mould to form cavities E and F through the top box, and of part of the depth of the core seat in the bottom. The mould was assembled in the usual way, the vent of the lower part of the core, being formed of cinders, was connected to the channel formed by the lower part of E and F. The top box was then placed in position and the cavity E, F filled with sand, leaving a small channel G, which was filled with cinders to allow of the free exit of gases to the atmosphere when the job was cast.

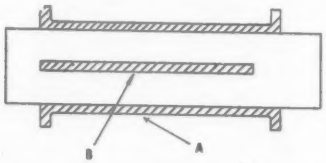


FIG. 1.—AIR COMPRESSOR INTER-COOLER.

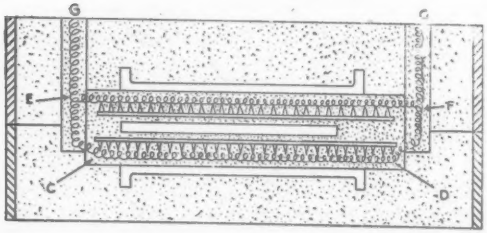


FIG. 2.—CROSS SECTION THROUGH THE MOULD SHOWING VENTING ARRANGEMENTS.

# Small Beginnings

*By T. R. Harris*

In the early days of the Industrial Revolution foundries capable of supplying the needs of the engineers were few and far between. One of the foundries supplying Boulton and Watt with castings was that of John Wilkinson. Often founders were not paid in cash but in kind, and from the letters of Boulton and Watt it is evident that Wilkinson was not too keen to receive "old brass" as part payment from some of the mines of Cornwall. Writing to Wilkinson on February 20, 1781, Watt says, ". . . Pray is it prudent to let Wh. Virgin employ founders there to cast up their Brass work in Buckets and Clacks, they may learn to creep, and in time to go upright. I think you had better take their brass . . ." That Watts' prophecy came true is a matter of history, for within 50 years of this letter the Cornish foundries of Hayle, Copperhouse and Perran rivalled any in the Kingdom.

### Early Job Records

An interesting sidelight on this development is given by extracts from an old ledger of George Cornish & Company, of Redruth, Cornwall. Situated in the heart of the mining district, George Cornish did a large business with the neighbouring mines in the usual lines associated with coppersmiths and braziers. Interspersed between these ordinary routine jobs are occasional mention of brass castings, of which the following are typical. Cornish apparently received the old brass from the mine, and charged for a pattern and fourpence a pound for melting and casting the brass. On the 27th of the ninth month of 1785, The Consolidated Mines Adventurers were charged "To casting 2 Valves weighing 57 lbs. at 4d.," while a contra account read, "By 112 lbs. Copper and Brass. Cast 63½ lbs. 48½ lbs. at 6d.," suggesting that old brass was worth 6d. a pound and the 48½ lbs. was thus credited to the mine. Other accounts give the price charged when the brass was supplied by the founder, as to the Adventurers of Polgooth Mine in February, 1784: "To 126½ lbs. of Whim Brasses at 11d.—To a pattern, 3s. 6d."; while Poldice was charged on 6th October, 1784, "To casting a piston rod weighing 162 lbs. at 1s. 2d., £9 9s. 0d." The price varied somewhat due probably to the difficulty of casting the job. Thus while a piston rod is charged at 1s. 2d. a lb., brass buckets are charged at 1s., a safety valve at 1s. 4d., and small brasses at 1s. 3d. Cornish employed a number of workmen whose accounts mostly read "By Sundry Work to this Day." Occasionally, however, the work is specified, as for John Davis in March, 1785. "By casting 2 Buckets, 9s. 8d. By 1 days work at the Church, 3s. 6d. By casting 2 small brasses, 1s. 0d." These extracts illustrate a tendency on the part of industrialists of Cornwall to execute foundry work for the mines on the spot and become independent of the foundries of Wales and the Midlands and show from what small beginnings the Cornish foundries came.

# Publications Received

**The Iron and Steel Trades in 1947.** Published by William Jacks & Company, Limited, Winchester House, Old Broad Street, London, E.C.2.

This review is the most clearly written and the most incisive of the many we have received from this great merchant house over the years. The author initially stated that he proposed to give a dispassionate survey, that is, one free from political bias. Yet somehow or other, his work has outlined such a strong, well authenticated argument against the nationalisation of the steel industry that we deem it to rank amongst the best we have so far read. Most of what he says, however, also applies to the gas industry. The only criticism we have to make is that the review should have carried a section dealing with the ironfounding industry. This omission is no doubt due to the fact that, until recently, it possessed very few statistics, but this has now been remedied and we shall expect to see the subject covered when the 1948 Review appears.

**The Gas Industry—Facts and Figures.** Published by the British Gas Council, 1, Grosvenor Place, London, S.W.1.

This 40-page pamphlet is a plain statement of what exactly the British gas industry has done, is doing, and could do for the community under free enterprise. It is issued with the object of supplying the public with factual information in order that those specifically interested in converting the industry into a State monopoly may reach sane and equitable conclusions. Through enterprise this industry led the world in its own field. Under enlightened management, the co-partnership schemes have developed so that to-day 54,000 employees hold £4½ million interest in the industry. The booklet lists all the disadvantages to be associated with its exploitation as a State concern, but no advantages are set out, because, apparently, like the reviewer, the authors cannot think of any.

# New Catalogue

**Furnaces.**—Just why Stein & Atkinson, Limited, of Parnell House, 25, Wilton Road, London, S.W.1, used such a large format for their new publication "Modern Industrial Furnace Review" is difficult to understand, unless (1) they were desirous of being different from the general run of such trade matters, or (2) it was a question of the availability of paper and machines. The query arises because the copy reaching this office was badly creased and is too large for these post-war files. Yet there is a freshness about it, reminiscent—to use an Irishism—of pre-war publicity. It is impressive; it is excellently laid out; it maintains interest by the presentation of clear illustrations; and it makes good use of colour. Founders will be interested, and perhaps not a little astonished, to learn that this firm has installed over a hundred rotary melting furnaces. The reviewer from the very inception of these furnaces had confidence in their future, and is pleased to learn that this faith was not misplaced.

# Book Reviews

**Advanced Industrial First Aid, 1947.** By R. A. Trevethick, M.B., Ch.B. Published by the United Steel Companies, Limited, and obtainable from the printers, Henry Garnett & Company, Limited, "Advertiser" Office, Rotherham. Price 3s.

The reviewer is no expert in the field of first aid, but is sufficiently cognisant of the subject to realise that the statement that the use of a tourniquet is now obsolete is somewhat revolutionary. The author has certainly "sold" the idea to the reviewer as being a real advance in first-aid practice. The author in a number of instances has resorted to the negative "Don't"; this is bad psychology and in future editions the phrases should be rewritten to make them positive; they will be just as expressive. The booklet, which runs to 64 pages, is divided into 13 chapters and covers all accidents likely to be encountered in foundry practice. It is with the utmost confidence that the reviewer recommends its purchase by every concern in the industry, both home and overseas, for the sole reason that it is more useful and sensible than the earlier standard handbooks on the subject.

**German Domestic Solid Fuel Appliances.** Published as B.I.O.S. Report No. 1698, by H.M. Stationery Office. Price 6s. net.

The reviewer has studied quite a large number of B.I.O.S. reports, and their quality varies from excellent to rank bad. While trying to assess the possible value of this report to British manufacturing interests, one cannot help but think its main worth is to German industrialists, as it discloses facts about types of domestic stoves in which they are more interested than the British. This is because the market's demands have developed, and will continue to proceed, on different lines. The technical information disclosed is scrappy, and to the reviewer it is obvious that the team, like many others, were not primed with instructions as to what type of information would be of maximum value to the home manufacturer. The catalogue of visits to the various targets gets boring. The degree of bombing, the number of men employed, a criticism of the finish of the goods and similar data do not provide much meat for trade-hungry industrialists. The Consular Reports of pre-war days were of more interest and were reinforced by import and export statistics. For a report of this type under review, an attempt should have been made to obtain details of just why the Germans could meet the requirements of, say, the Venezuelan market, while other countries could not. The pre-war reports gave the statistical data, and post-war examinations should have revealed reasons, both commercial and technical. This particular report cannot be recommended as being of outstanding interest to the people to whom it should have a maximum appeal.

V. C. F.

# Correspondence

*[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]*

## PROMOTION WITHIN THE FOUNDRY

*To the Editor of the* FOUNDRY TRADE JOURNAL.

SIR,—It is with sincere pleasure that I have read reports that the foundries are taking a good deal more interest in the training of youth and are encouraging the furtherment of technique. This is all very well, but what of the future of those now in the industry? It is still to be noticed in the advertisement columns that, when an applicant is required, he must apply in writing and state the salary. Now, this is the usual method, and I along with many others am at a loss to understand how a firm arrives at a decision on any man from a written and often stereotyped reply to these advertisements, which may or may *not* be the product of the applicant. Many a good practical man has failed to receive a reply to or acknowledgment of an application, leaving him with a feeling of frustration, and often disgust, at the lack of courtesy shown by the advertisers. In addition, I would like to know why it is that some managements do not assist a promising man to better his position. Take the case of a man who proved his ability to work on all the floors, the pattern moulders' and the machine section. Ambitious, he wished to work on the administrative side of the business. Imagine his feelings when the foreman left and his name was mentioned for the position, to be airily dismissed with "No technical qualifications" and "Who could we get to replace him." This man's interest in the foundry died. In concluding, may I ask the managements, when advertising, to give a little help to the applicant who tries to leave the foundry floor? It is possible thus to pick up a "gem"; perhaps a little "uncut" in the art of management, but with the ability to make a firm success of the job he seeks.—Yours, etc.,

"TEAK."

February 26, 1948.

## TESTING METALLIC ABRASIVES

*To the Editor of* THE FOUNDRY TRADE JOURNAL.

SIR,—I wish to take this opportunity of expressing my appreciation of the interest taken by your correspondents in the subject matter of my Paper dealing with Methods of Testing Metallic Abrasives. The apparently simple apparatus suggested and described by Mr. F. W. Neville in your issue, dated February 5, is extremely interesting as a method designed to determine the cutting capacity and life of abrasives in the form of grit. The fact that it is designed to operate with as small a quantity of grit as one pound is very attractive and, of course, important from the point of view of laboratory testing. More nearly to duplicate the velocities of shot streams adopted in present-day pressure or mechanical thrower plants, the need to have available comparatively high pressure air supplies (up to 200 lb. per sq. in.), is somewhat of a disadvantage.

In our own considerations of forms of testing designed to provide similar information, we are inclined to take the view that apparatus based upon the use of the mechanical thrower system offers advantages. We believe such apparatus has been designed and is in use in America. The larger scale of operation necessitated need not make the determination of the comparative behaviour of abrasives unduly prolonged.

Progressive reduction in density of the shot stream, and accuracy in recovery of the used abrasive in so far as they can effect the determinations, can be minimised in larger scale operation, as also the effect of nozzle wear which is avoided in the mechanical thrower system.

The method of determining the crushing index developed in our laboratories is designed to enable quantitative expression to be given to the comparative toughness or, alternatively, brittleness of metallic grit. It is useful to have a test of this kind particularly in that it can be applied to the small samples so frequently sent to the laboratory for testing.

In connection with grading, both the practices mentioned by Mr. Neville are followed in the manufacture of grit. The grading operation itself is a screening operation, and I am not aware that air flow methods of grading have been adopted.

The use of a method resembling the crushing index determination in the grading of moulding sands by Mr. Donaldson as described in your issue dated February 12 is also interesting.

The correspondence from Mr. McGregor in your issue dated February 19 is particularly pleasing. You yourself have already commented on the interesting contribution to the early history of metallic abrasives made by Mr. McGregor. It is worth while adding that the subject of the chemical composition and also the effect of heat-treatment on the characteristics of metallic abrasives are matters of continuous study on the part of the Research Laboratories of the organisation with which I am associated.

Yours, etc.,

J. E. HURST.

March 4, 1948.

## *Metal Flow Research*

The British Iron and Steel Research Association has now obtained a licence for erecting limited accommodation of temporary construction on a site at Meadow Street in Sheffield. This temporary building will provide some further accommodation for the expanding programme of research on metal-working problems. At the present time, B.I.S.R.A.'s investigations at Sheffield are widely scattered between Sheffield University, Applied Science Department (where there is an experimental rolling mill), the works of Arthur Lee & Sons, Limited (where there is a prototype backpull wire-drawing machine), and elsewhere. The intention is ultimately to create a permanent building in which rolling, drawing and other similar researches will be centralised. It is hoped that these new metal-flow laboratories will ultimately be among the best equipped laboratories for their purpose in the world.

# National Insurance Scheme Explained

With the exception that persons whose income does not exceed £104 per annum can secure exemption, every person will be brought into compulsory insurance when the new scheme under the National Insurance Act, 1946, comes into operation on July 5, 1948. This new scheme incorporates the present schemes of Unemployment, and Health and Pensions Insurance into one scheme, with one contribution covering the whole of the benefits. There will, however, be three classes of insured persons: Class A (employees), Class B (self-employed persons, being those gainfully occupied, but not under a contract of service, that is, employers, self-employed, traders, persons on own account generally), and Class C (non-employed), being persons not gainfully occupied in any way. Voluntary contributors under the present schemes will mostly go into Class B, that is, those persons of the same classes as mentioned above, although some, those who were over scale in salaries for compulsory insurance, will go into Class A.

### Benefits

Class A persons are eligible for all benefits; Class B for all except Unemployment Benefit; Class C for all except unemployment, sickness and maternity benefit. All classes are eligible for the benefits of the National Health Service, thus free medical, hospital, dental, optical, nursing benefits, etc.

A feature of Sickness Benefit (1), Unemployment Benefit (2) and Retirement Pension (3) is that the chief rate is 26s. for each individual, plus 16s. for a wife or other adult dependant (pension, wife only) and plus 7s. 6d. for the eldest or only child of school age (other children come under the Family Allowances Scheme). In connection with (3), if the wife is not gainfully occupied, the 16s. is included with the husband's pension, even though the wife is not 60. The ordinary pensionable age is 65 for a man; 60 for a woman. If the wife is insured in her own right, she is eligible for 26s. at 60; thus 26s. for her, 26s. for the husband if 65 and qualified.

Other benefits are Maternity Benefits (three kinds), Widow's Allowances (three kinds), Death Grant, and Guardians' allowance (*i.e.*, orphans). Space economy forbids the publishing of details, but all widows get 36s. per week for the first thirteen weeks (plus 7s. 6d. for a child), with other allowances following on according to age and time since, or length of, marriage.

### Conditions

To secure benefits (1) and (2) there must have been at least 26 contributions paid, with at least 50 paid or credited in the contribution year (runs July to July) which precedes the relevant benefit year (runs January to January); for totals under 50, lower rates of benefits apply for that year. Under these conditions sickness benefit goes on for 312 days (*i.e.*, one year), when it ceases, but right to such is revived when a further thirteen contributions (in thirteen weeks) have been paid. If, however, at least 156 contributions have been paid since entry into insurance, sickness benefit can go on indefinitely. For unemployment benefit, 180 days' benefit can be drawn, plus additional days according to the insurance history of the claimant, and other days may be granted by local committees who will function for this purpose. The requalification for benefit provision, as just explained for benefit (1), applies for unemployment benefit likewise.

To qualify for a retirement pension, at least 156 contributions must have been paid since entry into insurance (applies for widows' allowances also; husbands' insurance), with a contribution average of 50 at pensionable date. A "contribution average" is obtained by taking the total number of contributions paid throughout insurance and dividing by the number of contribution years since entry into insurance. A point of substance, however, is that the pension is not payable between the ages of 65 and 70 (women, 60 and 65) unless retirement from business or work takes place; at 70 (women 65) the pension is payable whether work is continued or business is carried on and irrespective of amount of earnings. But fulfilment of the retirement rule takes place even though there may be earnings of only 20s. per week; for every 1s. earned over 20s., 1s. is knocked off the pension of 26s., so if 36s. per week is earned, there can still be a pension of 10s. per week. Pensioners, when the scheme comes in on July 5, 1948, can continue to receive the old rate pension (10s. plus 10s. for wife) irrespective of amount of earnings and whether at work or in business or retired.

If a pension is not taken between 65 and 70 (women, 60 and 65), sickness benefit is available (unemployment benefit also for Class A), but in these cases contributions are payable until retirement takes place or 70 is reached (women 65).

### Contributions

For Class A the full contribution is, for men, 8s. 5d. if 18 years or over, 6s. 7d. for women, 4s. 11d. for boys under 18 years, 3s. 11d. for girls; the employer pays the whole, but he can recover from the employee 4s. 7d., 3s. 7d., 2s. 8d., and 2s. 2d. respectively. For Class B the rates for men 18 years and over are 6s. 2d., for women 5s. 1d., for boys under 18 years 3s. 7d., for girls 3s. 1d.; for Class C, 4s. 8d., 3s. 8d., 2s. 9d., and 2s. 3d. respectively.

### Pertinent Matters

If, when entering insurance, a man is 55 or over, a woman 50 or over, a retirement pension is not payable until ten years' insurance is registered, and if pensionable age is reached before this ten years' insurance period has passed, contributions can be paid after this age to qualify even if retirement from business or work has taken place. In these cases the Class C rates would apply. This means that in practice everyone will be required to register ten years' insurance for pension. All persons will enter insurance at school-leaving age, and continue insured until 65 or 60, according to whether man or woman; but note the following as regards those already insured under the present schemes. For these only five years' insurance is necessary for this condition, with 104 contributions actually paid since entry into insurance, but there must be a contribution average of 50 for a full-rate pension.

# News in Brief

THE FOUNDRY OF J. & C. McGloughlin, Limited, engineers and art-metal workers, of Dublin, was damaged by fire recently.

WILLIAM GRAY & COMPANY, LIMITED, West Hartlepool, has received an order for two vessels of 5,100 tons from Ellerman Lines, Limited.

FIVE VESSELS arrived on March 1 at Grangemouth from German ports with cargoes of scrap steel, including gun barrels and other armaments.

HARLAND & WOLFF, LIMITED, has building, or on order, a total of 29 oil tankers, the largest accumulation of tanker tonnage in the company's history.

THE NAME OF Morgan & Orme, Limited, manufacturers of sawmill machinery and plant, etc., of Bristol, has been changed to Roco Products, Limited.

JONAS WOODHEAD & SONS, LIMITED, spring manufacturers, of Leeds, is extending its works by the acquisition of Moorcroft Mill, Ossett. It is hoped to start production there by the end of the month.

VICKERS-ARMSTRONGS, LIMITED, Newcastle-upon-Tyne, is converting Sherman tanks into tractors for felling trees and clearing jungle in Africa. The tractors weigh 11 tons and have 225 h.p. engines.

ROSE BROS. (GAINSBOROUGH), LIMITED, engineers and ironfounders, held a "Crafts and Export" Exhibition last week, showing various types of automatic machinery working under factory conditions.

MITCHELL, SHACKLETON & COMPANY, LIMITED, crankshaft makers, of Patricroft, Lancs, has acquired the whole of the share capital of the old-established business of Clarke's Crank & Forge Company, Limited, Lincoln.

TWENTY FRENCH ENGINEERS from the main shipbuilding yards are attending a course organised by the British Council, during which they are visiting Liverpool, Sheffield, Manchester, Barrow-in-Furness, and Belfast.

SIX HUNDRED WORKERS struck on March 1, when Ransomes & Rapier, Limited, engaged four Poles at its works at Ipswich. The men have returned to work this week and discussions are taking place on the situation.

THE HUNSLET ENGINE COMPANY, LIMITED, has received orders for four 48-ton 18-in. cylindered locomotives to the 0-6-0 "Austerity" saddle-tank design for heavy shunting duties at collieries in the North of England.

THE COUNCIL OF King's College, Newcastle-upon-Tyne, is planning the erection of a new engineering block. Work is still proceeding on the new £200,000 chemistry block and other additions, but is being impeded by shortage of materials.

ORDERS have been received by the Furness Shipbuilding Company, Limited, Haverton Hill-on-Tees, for a tanker of 24,000 tons for American and a tanker of 16,000 tons for Swedish owners. The company now has nine 24,000-ton tankers on order in addition to another of 27,000 tons.

MR. JOSEPH B. CHIFLEY, the Australian Prime Minister, has announced that his Cabinet has allocated £750,000 for the purchase of six 3,000-h.p. marine engines and that consultations are to begin with a British company. Two of the engines are required in 1949 and the remainder later.

MR. G. H. R. TOWERS, managing director of John Readhead & Sons, Limited, South Shields, stated recently that there were 8,000 fewer men in the North-East Coast shipbuilding industry, compared with 1942. The number was, however, greater than in 1939 and about the same as the 1930 figure.

THE DIRECTORS OF Cammell Laird & Company, Limited, shipbuilders and engineers, of Birkenhead, state that as the accounts for 1947 were not completed for consideration at last week's board meeting, the usual dividend declaration made about this time of the year will be deferred until the next board meeting on April 2.

A RESOLUTION calling for "peak of priority" for shipping, shipbuilding and shiprepairing was moved by Sir Guy Ropner at the annual meeting of the United Kingdom Chamber of Shipping. The resolution, which secured unanimous assent, urged the speediest restoration of the British mercantile marine to its pre-war volume.

ASSOCIATED BRITISH OIL ENGINES, LIMITED, announce that, in spite of rising costs in materials, improved production methods have enabled the company to reduce the selling price of the small Petter single-cylinder air and water-cooled petrol and petrol/paraffin engines (1½ to 5 b.h.p.) by 20 per cent. The price revision took effect last week.

SIR WILLIAM FRASER, chairman of the British Tanker Company, Limited, stated at the launch of the tanker British Fame, built for the company by Swan, Hunter & Wigham Richardson, Limited, Wallsend, that it now took 20 months to build a tanker, compared with 12 months before the war. He added that delay in repairing ships reduced their efficiency by 10 per cent.

FOUR COMPANIES—A. Kershaw & Sons, Limited, precision engineers, etc., of Leeds, Kalee, Limited, Taylor, Taylor & Hobson, Limited, engraving machine makers, Leicester, and British Acoustic Films—have amalgamated to form a new company called British Optical & Precision Engineers, Limited. The chairman of the new company, which will have a capital of £3,250,000, is Mr. J. Arthur Rank.

THE COUNCIL OF THE ROYAL STATISTICAL SOCIETY offers the Frances Wood memorial prize, value £30, for competition in 1948. The prize is offered for the best investigation, on statistical lines, of any problem bearing directly or indirectly upon the economic or social conditions of the people. Competitors, who need not be fellows of the Society, will choose their own subjects. Details are obtainable from the offices of the society, 4, Portugal Street, London, W.C.2.

MR. LAUNCELOT SMITH, giving his last address as chairman at the annual meeting of Smith's Dock Company, Limited, said there was prospect of full employment for several years in the repairing and shipbuilding

departments of the company at North Shields and South Bank. In a reference to the extensive reconditioning work in hand, he disclosed that one contract alone amounted to nearly £500,000.

THE INSTITUTION OF MECHANICAL ENGINEERS has divided the Clayton Prize for 1947 in equal moieties. One half, valued at £650, is awarded to Mr. J. E. Sears for his services to engineering science and manufacture by research and development in metrology and gauging. The other half is awarded to Mr. T. E. Beacham for his contribution to the development of the variable-pitch propeller and high-speed hydraulic pumps and other hydraulic devices.

IMPORT AND EXPORT FIGURES for the Tyne during 1947 show that imports of iron and steel manufactures and scrap were 57,379 tons (38,425 tons in 1946 and 82,008 tons in 1938); metals and minerals, 54,432 tons (37,242 tons, 183,500 tons); iron ore, 385,555 tons (360,543 tons, 405,336 tons); while exports included firebricks and fireclay, 4,432 tons (5,917 tons, 10,398 tons); iron and steel manufactures 64,420 tons (61,997 tons, 48,465 tons); and lead goods, 7,085 tons (8,975 tons, 23,730 tons).

CONTRACTS for the building of eight ships have been secured by five Scottish companies. Charles Connell & Company, Limited, of Glasgow, is to build two cargo motorships; Alexander Stephen & Sons, Limited, Glasgow, two twin-screw motorships; Harland & Wolff, Limited, Glasgow, a tanker for Norwegian owners; Ailsa Shipbuilding Company, Limited, Troon, a self-trimming collier of about 3,400 tons d.w.; John Lewis & Sons, Limited, Aberdeen, a trawler for the St. Andrew's Steam Fishing Company, Limited, Hull; and Alex. Hall & Company, Limited, Aberdeen, is to build a trawler for West Hartlepool owners.

## British Power Press Manufacturers' Association

A trade organisation for British firms manufacturing power presses has been established under the title of "The British Power Press Manufacturers' Association," with the following 10 founder members:—E. W. Bliss (England), Limited, London; British Clearing Machine Company, Limited, London; Cowlishaw, Walker & Company, Limited, Biddulph, Stoke-on-Trent; Humphris & Sons, Limited, Parkstone, Dorset; E. H. Jones (Machine Tools), Limited, London; Metal Box Company, Limited, London; Moon Bros., Limited, London; Joseph Rhodes & Sons, Limited, Wakefield; Taylor & Challen, Limited, Birmingham; and Wilkins & Mitchell, Limited, Darlaston.

The offices of the Association will be at Standbrook House, Old Bond Street, London, W.1.

The first Council of the Association comprises Mr. Henry D. Challen, chairman (Taylor & Challen); Mr. H. B. Moon (Moon Bros.); Mr. W. S. Rhodes (Joseph Rhodes & Sons); Mr. E. C. Seed (Cowlishaw, Walker & Company); and Mr. A. E. Whyman (E. W. Bliss).

The secretary of the Association is Mr. Gilbert T. Beach, who is also secretary of the Gauge and Tool Makers' Association.

## *Recent Wills*

ROPER, E. A., foundry engineer, of Keighley ... ... £5,270

SIM, JAMES, chief draughtsman of G. & J. Weir, Limited, engineers and founders, of Glasgow ... £8,106

MARMION, P. E., a director of Imperial Smelting Corporation, Limited, and other companies ... £140,739

VEARS, GORDON, works manager and engineer of Lambert Bros. (Walsall), Limited, ironfounders, etc. ... ... ... ... ... ... ... ... ... £8,363

TALLENTS, T. F., a director of Falmouth Docks & Engineering Company, Limited, and other companies ... ... ... ... ... ... ... ... £31,636

LILLEYMAN, T. G., founder and managing director of T. G. Lilleyman & Son, Limited, drop forgers, of Sheffield ... ... ... ... ... ... ... ... £18,111

GARNER, J. R., managing director of Howell & Company, Limited, steel manufacturers, etc., of Sheffield ... ... ... ... ... ... ... ... £75,015

THOMAS, E. W. H., formerly works manager of Richardsons Westgarth & Company, Limited, Hartlepool ... ... ... ... ... ... ... £929

ELLIS, W. H., late senior partner in J. J. Habershon & Sons, Limited, steel rollers and founders, etc., of Rotherham ... ... ... ... ... ... ... £70,481

GEIPEL, THOMAS, section engineer of Imperial Chemical Industries, Limited, and a member of the Tees Industrial Development Board ... ... £4,014

MARMONT, B. P., formerly a director of the Dunkirk branch of Wright, Bindley & Gell, Limited, manufacturers of metal pressings, etc., of Birmingham £19,154

HARRISON, H. N., of Surbiton, a member of the General Council of the T.U.C., and late president of the Confederation of Engineering and Shipbuilding Unions of the United Kingdom ... ... £7,617

## Head, Wrightson to Redeem Debentures

The directors of Head, Wrightson & Company, Limited, general engineers, steel founders, etc, of Thornaby-on-Tees, have given notice to redeem the £134,200 4½ per cent. debentures at 110 per cent. on August 26 next. To provide the necessary funds the capital is to be increased. It is proposed to convert the unissued 40,870 6 per cent. preference into 4½ per cent. preference, and to create 290,000 4½ per cent. preference shares of £1 each, bringing the total authorised preference capital up to £500,000.

The 330,870 4½ per cent. preference will constitute one class of shares ranking *pari passu* in all respects (except as regards the rate of fixed dividend) with the 169,130 issued 6 per cent. preference. An offer of 300,000 of the 4½ per cent. preference is to be made to the existing preference and ordinary share holders. The proposals will be submitted at meeting to be held on March 18.

THORN ELECTRICAL INDUSTRIES, LIMITED, Judd Street, London, W.C.1, has received Treasury consent for an issue of 400,000 5 per cent. second preference £1 shares. The company is also issuing 80,000 ordinary shares to Sylvania Electric Products, Inc., Boston, U.S.A., at 23s. 9d. each in connection with an agreement under which the English company secures the technical co-operation and assistance of the American company.

## Personal

MR. HUGH R. NEILSON and MR. I. M. STEWART have been elected directors of Glenfield & Kennedy, Limited, hydraulic engineers and founders, of Kilmarnock.

LORD BRAINTREE, chairman of the Crittall Manufacturing Company, Limited, Darlington, has been appointed to the Court of the Bank of England for four years.

MR. R. G. PATERSON and MR. R. E. PERCIVAL have been appointed to the board of Minimax, Limited, fire extinguisher makers and sheet-metal workers, of Feltham, Middlesex.

MR. R. H. S. TURNER has been appointed superintendent of the plant department of the Metropolitan-Vickers Electrical Company, Limited, in succession to the late Mr. F. A. Pucknell.

MR. P. F. JONES and MR. C. N. SILVERSIDES have been appointed divisional engineers of the equipment division of Specialloid, Limited, piston manufacturers, of North Finchley, London, N.12.

MR. JOHN ALCOCK, joint managing director of the Hunslet Engine Company, Limited, Leeds, has been appointed a director of W. G. Bagnall, Limited, locomotive designers and builders, of Stafford.

MR. E. D. SUTCLIFFE has been appointed a director of Richard Sutcliffe, Limited, conveyor manufacturers, of Horbury, Yorks. MR. W. F. G. SUTCLIFFE has been appointed general manager of the company.

COL. T. J. THOMPSON, governing director of John Thompson (Wolverhampton), Limited, and a specialist in modern boiler practice, has been made an honorary life member of the Institution of Mechanical Engineers.

MR. W. G. TAYLOR, departmental manager at the Murihall Foundry, Larbert, of Robt. Taylor & Company (Ironfounders), Limited, has been presented with an inscribed silver salver as a wedding gift from the employees.

MR. M. W. SHORTER has been appointed sales manager of the Westinghouse Brake & Signal Company, Limited. MR. C. SPRANG has been appointed deputy sales manager, and MR. H. J. WILLETT assistant sales manager (rectifier department).

MR. G. A. MILLER, undermanager of Dorman, Long & Company's Kilton ironstone mine, Yorks, has been appointed manager of Lumpsey mine in succession to MR. J. R. TOMLINSON, who has been appointed agent of the company's Cleveland mines.

MR. J. DENHAM CHRISTIE, formerly chairman of Swan, Hunter & Wigham Richardson, Limited, Wallsend, has relinquished his seat as a dues payers' representative on the Tyne Improvement Commission. He has been succeeded by MR. J. M. ORMSTON.

MR. R. H. HOWATT has been appointed sales manager of the steam turbine department of the English Electric Company, Limited. He joined the company in January, 1946, as deputy to Mr. J. T. Moore, who, as announced below, has been appointed chief engineer of the company.

MR. E. JEWITT, vice-principal and head of the engineering department of Derby Technical College, has been recommended by the Walsall Education Committee as the new principal of Walsall Technical College, in succession to MR. W. COOPER, who has taken a similar post at Rugby.

MR. E. W. HANCOCK, who is joining the board of Humber, Limited, Coventry, will undertake the duties of general manager (works) as from April 1. He has been works general manager with Rubery, Owen & Company, Limited, motor and structural engineers, of Darlaston, Staffs, since 1942.

MR. A. BRADBURY, who has been with the company for 40 years, has been appointed commercial manager of the Staveley Coal & Iron Company, Limited. MR. ERNEST ASHWELL has been appointed general manager of the company's ironstone mines in succession to MR. S. N. TURNER, who was recently appointed deputy managing director.

MR. M. KEITH, who has been on the staff of James Gordon & Company, Limited, combustion engineers and boiler control specialists, of Stanmore, Middlesex, for a number of years, has been appointed sales and service engineer to the firm in Yorkshire and North Lincolnshire. He will operate from his address at 24, Hyde Terrace, Leeds.

MR. L. G. AXE, manager of the B.T.-H. transformer sales department, has relinquished this position on taking up an appointment with the British Thomson-Houston Export Company, Limited. MR. G. W. EDGLEY, manager in the Leeds district, is to be manager of both the B.T.-H. transformer sales and mining departments. He is succeeded as manager in Leeds by MR. H. G. HARLOW.

MR. A. S. WARD has relinquished his position as managing director of the Park Gate Iron & Steel Company, Limited, Rotherham, but remains chairman of the company. MR. T. EDWARDS and MR. C. H. T. WILLIAMS, previously directors, have been appointed joint managing directors, and MR. F. WOODIFIELD has been appointed a director and works manager of the company. MR. A. K. WILSON has resigned from the board.

MR. J. T. MOORE has been appointed chief engineer of the English Electric Company, Limited, in succession to MR. A. D. SLOAN, who retired at the end of 1947. Mr. Moore joined the company in 1936 as sales manager of the steam turbine department at Rugby. In 1945 he was appointed manager of the department, with his headquarters at the London office. His future headquarters will be at Stafford. He has made a number of extensive tours abroad on the company's behalf. Mr. Sloan had been chief engineer of the company since 1936. His career with the organisation began with his apprenticeship in 1900 at the Dick, Kerr Works, Preston.

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CONSIDERABLE DAMAGE was done by a fire at the works of James Cotterell & Sons, Limited, malleable-iron and non-ferrous founders, of Walsall. Production was not expected to be affected.

Save Fuel
IN YOUR CUPOLAS
BY USING
STANTON
HOLWELL
or RIXONS
SAND-LESS
MACHINE CAST
PIG IRON
THE STANTON IRONWORKS COMPANY
LIMITED
NEAR NOTTINGHAM

# Company News

*(Figures for previous year in brackets.)*

**Radiation**—Dividend of 12½% (10%).

**Senior Economisers**—Dividend of 70% (nil).

**Wildt & Company**—Dividend of 50% (nil).

**Lightalloys**—Interim dividend of 5% (same).

**Worthington-Simpson**—Dividend of 20% (same).

**Oldham & Son**—Interim dividend of 30% (same).

**Heenan & Froude**—Interim dividend of 5% (same).

**Rivet, Bolt & Nut Company**—Dividend of 15% (same).

**Heenan, Beddow & Sturmey**—Dividend of 15% (same).

**John Baker & Bessemer**—Dividend of 15% (10% and bonus of 5%).

**Rheostatic Company**—Final dividend of 14%, making 20% (14%).

**Thomas Robinson & Son**—Final dividend of 5%, making 7½% (same)

**Lehmann, Archer & Lane**—Final dividend of 75%, making 100% (40%).

**Ransome & Marles Bearing Company**—Interim dividend of 7½% (same).

**Neepsend Steel & Tool Corporation**—Interim dividend of 15% (same).

**S. Guiterman & Company**—Dividend of 12½% (same) and bonus of 7½% (2½%).

**Barrow Hematite Steel Company**—Final dividend of 7½%, making 12½% (same).

**Evered & Company**—Dividend of 15% (same) and special jubilee bonus of 5% (nil).

**Waste Heat & Gas Electrical Generating Stations**—Final dividend of 5½%, making 8% (same).

**G. D. Peters & Company**—Final dividend of 7½% and bonus of 2½%, making 17½% (same).

**Richard Lloyd**—Dividend at the rate of 1s. per share (same), plus 2½d. per share out of accumulated interest on tax-reserve certificates.

**Waygood-Otis**—No final dividend on the ordinary shares. An interim of 17% was declared last December. For 1946 the distribution was 20% in two equal payments.

**H. & J. Hill (Willenhall)**—Net profit for 1947, after charging depreciation, taxation, etc., £12,566 (£4,460); E.P.T. over-reserved, £412 (£21); to general reserve, £1,500 (£1,000); written off goodwill, £2,800 (nil); final dividend of 35% (15%), making 50% (30%); forward, £2,806 (£1,434).

**Bruce Peebles & Company**—Profit, after taxation, etc., for 1947, £44,239 (£29,474); tax provision not now required, £35,000; to research and development reserve, £35,000 (£15,000); general reserve, £25,000 (nil); dividend of 5% (same) and bonus of 5% (same); forward, £24,747 (£18,095).

**M. Mole & Son**—Net profit for 1947, after taxation, depreciation, etc., £20,075 (£16,865); provision for taxation in past years not required, £3,028 (nil); dividend of 20% (15%) and bonus of 5% (same); to reserve, £10,000 (£3,000); deferred repairs and contingencies reserve, nil (£3,500); forward, £11,284 (£9,636).

**Monotype Corporation**—Profit for the year to September 30, 1947, after expenses, depreciation, etc., £82,705 (£63,942); to depreciation of investments, less appreciation of sales, £19,035 (nil); special pension fund, £10,000 (£12,684); reserve for overseas business, £10,000; research reserve, nil (£2,500); dividend of 15% (same); forward, £134,957 (£132,416).

**Vokes**—Trading profit for the year to June 30, 1947, £14,139 (£67,673); profit on assurance policy, £384 (nil); transfer fees, £59 (£76); E.P.T. provision no longer required, less income and profits tax, £3,097; to directors' fees, £1,600 (£1,700); written off premises and patents, £712 (£512); depreciation, £5,071 (£5,223); income-tax and E.P.T., nil (£48,924); net profit, £10,296 (£11,390); dividend of 12½% (same): forward, £25,165 (£23,869).

**London Aluminium Company**—Trading profit for 1947, after managing director's remuneration, £322,891 (£145,995); rent and interest, £2,126 (£1,372); to directors' fees, £850 (£1,712); depreciation, £27,595 (£21,393); tax, £172.863 (£96,935); net profit, £123,709 (£27,326); written off goodwill, £8,027 (nil); issue expenses, £3,319 (nil); to general reserve, nil (£3,121); final dividend of 75% (10%), making 100% (20%); forward, £19,542 (£2,741).

**Norton Industries**—Trading profit and interest for the year ended October 31, 1947, £80,538; to depreciation, £7,710; management and directors' salaries, £12,741; provision for E.P.T. and profits tax to October 31, 1947, £12,994; tax to 1948-49, £23,500; transferred to capital reserve, £20,223, leaving £3,370, which it is proposed to distribute to Norton Industries. An interim dividend at the rate of 15% per annum for six months has been declared. The company was made public in December, 1947.

**Webley & Scott**—Trading balance for 1947, £33,528 (loss £16,608); E.P.T. recoverable, nil (£21,405); profit on sale of investments, nil (£2,083); other income, £1,643 (£881); to depreciation, £4,868 (£4,715); directors' fees, £1,187 (£1,000); directors' additional remuneration, £841 (nil); profits tax, £4,750; income tax, £8,476; profit, £15,049 (£2,046); excess provisions in previous years. £8,857 (nil); to investment reserve, £2,500 (nil); dividend of 15% (same) and bonus of 5% (nil); forward, £49,150 (£36,035).

**Delta Metal Company**—Trading profit for 1947, £691,450; interest, £8,935; fees, £29; to depreciation. £48,796; directors' remuneration and fees, £37,297; staff pensions, £22,283; profits tax, £125,000; net profit, £467,038; dividends from subsidiaries, £25,000; to income tax provision, £300,000; general reserve, £39,250; dividend equalisation, £15,000; Colonial and export development, £15,000; welfare and benefit fund, £5,000; dividend of 12½% (same) and diamond jubilee bonus of 25% (10%), all tax free; forward, £38,726 (£33,138).

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# *Raw Material Markets*

## Iron and Steel

Although the output of foundry pig-iron is at a high level, it is still insufficient to cover all requirements. Some foundries are having the utmost difficulty in getting even the limited licensed tonnages in the periods nominated. There is a particular stringency in high-phosphorus iron; consumers are still limited to a two-month licence period and to not more than one month's stock, but owing to the shortage it is difficult even to maintain the latter. Foundries have plenty of business on hand; a fair percentage is for export, and for trades making export goods and machinery, as well as for essential industries. Consequently, claims for basic pig-iron are very strong. Unfortunately, there remains the scarcity of scrap, which accentuates the pig-iron shortage; considerable quantities of both cast-iron and steel scrap are urgently needed. The engineering foundries are receiving reasonable supplies of low- and medium-phosphorus iron, refined pig, and hematite, and the prospects in respect to hematite supplies are somewhat better as an additional furnace will become available shortly.

Foundry-coke supplies are coming through reasonably well at the allocated tonnages, which are, in most cases, sufficient to cover current orders without touching reserve stocks. No particular difficulty is experienced in meeting requirements in respect to limestone, ganister and ferro-alloys.

The re-rollers are feeling the recent diminution in supplies of imported billets and, although home supplies have increased, the gap remains. It is reported that increased supplies on a limited scale may become available from Belgium, but there seems little prospect of extra tonnage from any other countries. In the meantime, re-rollers have heavy order-books. Sheet bars, too, are in short supply, which is causing reduced outputs at the sheet mills; makers of strip are also restricted for the same reason. Re-rollers are taking up readily any offers from steelworks of defective sheet bars, billets, crops, etc., but as there is no stock of these, supplies are limited to arisings from current rollings. Where possible, re-rollers are utilising the limited supplies of electrically-melted steel.

Under the new authorisation scheme, it is thought that quite a considerable tonnage of plates, sections, joists, etc., now on the books at the steelworks will become dead, and consumers should then have a good prospect of getting the steel in the period for which it is nominated. A fair amount of steel under Government agreements is being allowed for export, but it seems that there will be little free tonnage available from either the steelworks or the re-rollers.

## Non-ferrous Metals

Last week saw the price of copper raised by one eighth of a cent per lb. from 21⅞ cents to 22 cents, f.a.s. New York, but it is not likely that any change will be made in the Ministry of Supply's present quotation of £132 per ton. Even now, there is an ample margin on the side of the British Government and, consequently, room for a reduction in the price charged to consumers. But it is probable that few people entertain any idea that a change is contemplated. In spite of the great efforts made to secure all possible supplies of copper for delivery during the present year from sterling areas of production and soft-currency sources, it would seem that a gap remains (providing consumption this year is no less than in 1947) which must be filled by dollar copper. Just what that tonnage is only the authorities know, but if the quantity arranged with Canada is on a fairly generous scale, it is not likely to be very large. Before the war, of course, we took a lot of copper from South America, much of it in the form of blister and fire-refined, and also some electrolytic. There will be electrolytic copper from the United States this year on the exchange contract under which we trade 70/30 brass scrap for the sake of its copper content, but this does not involve dollars, apart from the payment of the cost of refining; freight both ways is probably met on a sterling basis. Although this contract has lasted a good deal longer than seemed likely when the arrangement was made, it will presumably come to an end this year.

Another conversion contract will be in operation during 1948 as a result of the arrangement the Ministry of Supply has made to ship a quantity, believed to be about 25,000 tons, of Rhodesian blister copper to the United States for conversion into refined quality. This operation will be paid for in kind, *i.e.*, sufficient copper will be retained at the refinery to pay for the transformation of the blister, the balance being returned to the United Kingdom. Execution of the work, however, will be spread over several months and therefore the shipments coming back will be small, but, nevertheless, a useful addition to our refined-copper supplies. There is, of course, a very considerable production of refined copper in the United Kingdom, some of it in "shapes," such as billets and wire bars, etc., while the remainder is marketed in a form for melting, *i.e.*, ingots and ingot bars. The manufacture of this metal is based partly on blister and partly on scrap, the resultant product varying in quality, but being for the most part high-grade. There is also a certain amount of rough copper produced in this country and, lately, this has been going to the Continent for conversion into electrolytic and subsequently returned to the United Kingdom.

## Budd Induction Heating

The Ohio Crankshaft Company, of Cleveland, Ohio, owner of the TOCCO process, has purchased the induction heating division of the Budd Company, Detroit. The Electric Furnace Company, Limited, of Weybridge, which has the exclusive right in most of the British Empire and Western Europe to the TOCCO patents, and which co-operates technically on all forms of high-frequency heating with the Ohio Crankshaft Company, will accordingly now have the benefit of the Budd developments. These are chiefly connected with internal induction hardening and heating for forging.